

Towards Understanding the In Situ Agglomeration of Nickel Concentrate Powder During Flash Furnace Injection.

David Debrincat¹, Chris Solnordal², Jannie van Deventer³, Frank Jorgensen² and Peter Koh²
GK Williams Cooperative Research Centre for Extractive Metallurgy

¹Department of Chemical Engineering, The University of Melbourne, Victoria 3010, Australia,
c/o CSIRO Division of Minerals, Box 312, Clayton South, 3169, Australia.

²CSIRO Division of Minerals, Box 312, Clayton South, 3169, Australia.

³Department of Chemical Engineering, The University of Melbourne, Victoria 3010, Australia.

Abstract

Video observations were made of the injection process of nickel concentrate in a scaled down experimental shaft under ambient conditions. Agglomerate dispersion required the slip velocity between the solids and gas to be sufficiently large. The dominating mechanism for agglomerate dispersion was erosion at the external surface. Shielding of the plume's core caused the slip velocity of the agglomerates near the core to be decreased, giving agglomerates a better chance to remain intact. For the flow conditions considered the agglomerates were observed to have a wide size distribution with sizes up to 2 mm. Consideration for a theoretical model of the dispersion process has been made.